

$$\begin{aligned}
 1. \quad R &= 10 \log \frac{300 \text{ I}_0}{\text{I}_0} \\
 &= 10 \log 300 \\
 &= 24.8 \text{ dB}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad R &= 10 \log X \\
 70 &= 10 \log X \\
 7 &= \log X \\
 10^7 &= X \\
 &\text{10}^7 \text{ times as loud as the} \\
 &\text{threshold of hearing}
 \end{aligned}$$

$$\begin{aligned}
 \#8 \quad \text{pH} &= -\log [\text{H}^+] \\
 &= -\log [5 \times 10^{-2}] \\
 \text{pH} &= 1.3 \quad 5 \times 10^{-2}
 \end{aligned}$$

$$\begin{aligned}
 \#11 \quad \log(8 \times 10^{19}) &= 11.8 + 1.5M \\
 5.4 &= M
 \end{aligned}$$